

**QUICK RELEASE MECHANISM FOR USE
WITH A SUPPORTING DEVICE**

Background of the Invention

1. Field of the Invention

5 The present invention pertains to supporting devices such as those used for temporary warning signs and in particular to such support devices which employ adjustable legs and other adjustable components.

2. Description of the Related Art

10 It has been found convenient to provide temporary warnings alongside vehicle roadways, pedestrian walkways and other locations. Typically, temporary warning systems are erected from a collapsed or small sized storage configuration of relatively small size. Examples of leg release devices may be found in commonly assigned United States Patent Nos. 4,954,008 and 6,315,253. A collapsible sign stand base for use with an upright fiberglass rib is described in United States Patent No. 15 4,694,601 and other arrangements are shown in United States Patent Nos. 4,548,379; 4,593,879 and 5,340,068. Despite the favorable acceptance of these designs, improvements are continuously being sought.

20 Temporary warning signs typically employ ground-engaging legs configured with a base to support an upright mast. Typically, when the sign stand is deployed, the ground-engaging legs form an angle with the upright mast that is usually larger than 90°. It is generally preferred that a storage configuration be provided in which the legs are selectively collapsed or folded to a position generally parallel with the upright mast, in order to provide a compact storage and size suitable for construction vehicles and the like.

25 **Summary of the Invention**

 Oftentimes, ground-supporting legs are formed from hollow, rectangular tubing. If possible, it is beneficial to locate components of a leg release assembly within the tubing to prevent unintentional snagging with nearby materials. Furthermore, if most all of the leg release components can be located within the

tubing, and optimally a compact storage configuration can be realized. However, until the advent of the present invention, at least some of the leg release components have been mounted outside of the legs, in order to provide a rugged construction, sufficient to adequately retain locking pins in a desired position, despite rough handling
5 associated with construction work, as well as vibrations due to wind gusts. Substantially all of the leg release components employed by the present invention are located within the hollow tubular legs. Exceptions include only the locking pin tip and a smooth actuator button.

It is an object of the present invention to provide a release device for
10 use with support arrangements, such as those found in sign stands.

Another object of the present invention is to provide a release device for use with support legs of collapsible sign systems.

Yet another object of the present invention is to provide leg release devices which can be economically fabricated from a minimum number of
15 inexpensive parts.

These and other objects according to principles of the present invention are provided in a sign stand assembly which is comprises of a sign panel, a support base, an upright mast joining the sign panel and support base. This support base includes a plurality of plate portions which define a locking recess, a plurality of legs
20 that are pivotally connecting the legs to the plate portions. A locking pin carried on one leg, for movement toward and away from the locking recess defined by one leg. An actuator that has an end within said leg for pivotally engaging the pivotal connection. An opposed end with an outwardly protruding button that partially extends outside the leg and a medial portion within the leg that defines an opening for
25 receiving the locking pin in interlocking engagement therewith.

Brief Description of the Drawings

FIG. 1 is perspective view of a sign stand assembly with a release mechanism according to principles of the present invention;

FIG. 2 is a fragmentary perspective view thereof, with the sign stand
30 assembly shown in a collapsed position;

FIG. 3 is a perspective view of the support base portion thereof;
FIG. 4 is a bottom plan view of the arrangement shown in FIG. 2;
FIG. 5a is a cross-sectional view taken along the line 5a-5a of FIG. 3;
FIG. 5b is a cross-sectional view similar to that of FIG. 5a showing a
5 sequence of operation;
FIG. 6 is a plan view of a spring component thereof;
FIG. 7 is a top plan view of an actuator component thereof;
FIG. 8 is an elevational view of the actuator component;
FIG. 9 is a bottom plan view of the actuator component thereof;
10 FIG. 10 is a fragmentary bottom plan view of the sign stand assembly;
and
FIG. 11 is a fragmentary elevational view of the sign stand of FIG. 2.

Detailed Description of the Preferred Embodiment

Referring now to the drawings, and initially to FIG. 1, the sign stand
15 assembly is generally indicated at 10. Sign stand assembly 10 includes a sign panel
subassembly 12, which includes a sign panel 14 supported by a horizontal cross
member 16 and a vertical cross member 18, preferably in the form of a fiberglass rib.
The bottom portion 24 of the fiberglass rib 18 is mounted in a rib clamping device 34,
which is supported by a vertical body member 30. Body member 30 is in turn bolted
20 to a bracket 36 resiliently supported by a spring 50. With reference to FIGS. 2 and 3,
spring 50 is supported by a support assembly 52 including a platform portion 54
supported between side plates 84. Side plates 84 include ear portions 56 having holes
58 to receive a bolt fastener 92 which provides pivot support for ground-engaging legs
64 (see FIG. 1). Ears 56 further include holes 68 which, as will be seen herein, define
25 an extended or operational configuration of the legs as illustrated in FIG. 1. Ear
portions 56 also include holes 72 which define a collapsed storage position for the
legs 64, as illustrated for example in FIG. 2. As can be seen in FIGS. 5a and 5b, the
tip 110 of locking pin 106 has a reduced diameter to accommodate the clevis or
forked end 170 of actuator 150 (see FIG. 9). A shoulder 112 is formed in locking pin
30 106 for butting engagement with end 170 of actuator 150. Thus, actuator 150 and

locking pin 106 form a linkage assembly. Actuator 150 is received in a slot 66 formed in a side wall of leg 64 (see also FIG. 3). Actuator 150 cooperates with leg 64 and locking pin 106 in the manner which maintains actuator 150 captive within the leg. With reference to FIG. 3, it can be seen that the holes 58 which receive the bolt fasteners 92 are located at inner portions of the ears 56 while the locking holes 68, 72 are located at outer portions.

Referring to FIG. 4, ear portions 56a, 56b preferably form part of an integral side plate 84 while ear portions 56c, 56d form portions of a second side plate 86. Preferably, side plates 84, 86 are mirror images of one another although this feature is optional, and can be omitted, if desired. With further reference to FIG. 4, it can be seen that the legs 64 extend outwardly from outer surface portions 84a, 86a of side plates 84, 86. Pivot members in the form of bolt fasteners 92 pivotally connect legs 64 to the ear portions of side plates 84, 86. The legs 64 are located to one side of the ear portions with the bolt fasteners passing through the legs and ear portions. Bolt fasteners 92 have heads located adjacent the inner surfaces 84b and 86b. The bolt fasteners 92 extend through legs 64 and are terminated at their free ends by threaded nut fasteners 94. As can be seen in FIG. 4, the legs 64 comprise hollow tubing and have a preferred generally square cross-sectional shape. If desired, legs 64 can have an elongated, rectangular or non-square cross-sectional shape. With reference to FIGS. 3 and 4, bolts 92 pass through holes 58 formed in the ear portions 56 of plates 84, 86.

With reference to FIGS. 5a and 5b, a release assembly is generally indicated at 102. The release assembly 102 selectively interferes with the legs 56 to lock the legs either in the operational position shown in FIG. 1 or the storage position shown in FIG. 2. As mentioned, the legs 64 pivot about bolts 92 which are secured to the inner portions of the ears 56.

Referring to FIGS. 5-10, release assembly 102 includes a locking pin 106 having a head 108 and a tip or free end 110. The locking pin 106 is carried by leg 64 and preferably extends through the hollow interior of the leg. In FIG. 3, the locking pin 106 is illustrated as extending beyond the outer surface of ear 56 for

illustrative purposes. If desired, the locking pin 106 can be configured such that the free end 110 is located at or slightly recessed below the outer surface of ear 56.

In FIG. 5a, the locking pin 106 is shown in a fully extended or locked position. In the preferred embodiment, locking pin 106 has a generally cylindrical
5 body although other cross-sectional shapes can be employed, if desired. Locking pin 106 has a first end 110 of reduced diameter compared to the opposed end 108 and remainder of the locking pin body. A stepped shoulder 112 (see FIG. 5b) is formed at the transition of the two diameter sizes of the locking pin. As can be seen in FIGS. 5a and 5b, shoulder 112 provides abutting engagement with the forked or clevis end 170
10 of actuator 150 (see FIG. 9). As will be seen herein, the large diameter body portion of locking pin 106 is formed with an annular recess for receiving a spring member 120. If desired, the recess need not be annular, but can be comprised of linear recesses cut parallel to a tangent.

Referring to FIGS. 5a and 5b, release assembly 102 further includes a
15 spring member 120. The spring member 120 is preferably of a flat spring construction having first and second ends and a medial portion between the ends. The first end 122 of the spring defines a relatively shallow recess 124 giving the spring end 122 a forked or stirrup configuration. As schematically indicated in FIG. 3, recess 124 at least partially receives bolt 92.

20 Referring again to FIG. 6, the opposed end 128 of spring 120 defines a relatively deeper recess 130 which extends toward spring end 122. As can be seen in FIG. 6, the recesses 124, 130 are similar to one another, being located along the longitudinal center line of spring 120, but differ in their length.

With reference to FIGS. 5a and 5b, the free end 128 of spring 120 is
25 free to move back and forth, toward and away from bolt 92 and locking pin 106. Recess 130 is made sufficiently long so as to permit locking pin 106 to extend through recess 130 in the manner indicated.

Referring again to FIGS. 5-9, release assembly 102 further includes an actuator 150 having a generally curved or C-shaped body including a first end 170
30 with a recess 154 for receiving bolt 92. The opposed end 158 of actuator 150 includes a handle or tab 160 having a rounded free end portion. In the preferred embodiment,

the tab 160 of actuator 150 is relatively flat although it can take on a non-flat or profiled shape, if desired.

Referring again to FIG. 7, the central portion 156 of actuator 150 defines a stepped portion of reduced width allowing the actuator to be inserted
5 through the slot 66 in leg 64. The shoulders formed at the transition of the tab 160 and central portion 156 help to hold actuator 150 captive in leg 64, while allowing the actuator to undergo a rocking action about its curved portion 158 (see FIG. 8).

Referring again to FIGS 5a and 5b, as tab 160 is depressed, locking pin
10 106 is moved in the direction of arrow 166 (see FIG. 5b), due to the interlocking of actuator 150 and pin 106. As tab 160 is depressed, the slotted portion of locking pin 106 pushes against spring 120 causing the spring to compress or flatten slightly, with free end 128 of the spring moving in the direction of arrow 168 (see FIG. 5b). This stores spring energy which urges actuator 150 to return to its rest position illustrated in FIG. 5a. With tab 160 sufficiently depressed (see FIG. 5b), the free end 110 of
15 locking pin 106 is made to clear the plate ear portion 56, allowing the leg to be pivoted about bolt fastener 92, with the leg assuming its desired orientation.

Referring to FIG. 11, a U-shaped shield plate 170 is secured to the outer surface of leg 64 which faces ear portion 56. Preferably, leg 64 is made of relatively soft aluminum material desirable for its strength and relatively lightweight characteristics. The
20 optional shield 170 toughens the outer surface of leg 64 which would otherwise be subjected to wear as the leg 64 is pivoted between its collapsed or rest position (see FIG. 2) and its extended or operating position (see FIG. 1). Shield 170 is preferably made of a mild steel material.

Referring to FIGS. 2 and 11, it will be seen that the tab portion 160 is
25 slightly curved or bent with respect to the adjacent body portion of actuator 150. This configuration effectively shields the free end 110 of the locking pin 106 and presents a conveniently engageable surface for the operator of the supporting device. When employed with a sign stand arrangement, such as that illustrated in FIG. 1, an operator can rest the collapsed supporting device (see FIG. 2) on the ground, and use the
30 actuator as a foot operated release while guiding the free ends of legs 64 to their desired positions as shown in FIG. 1. As shown in FIG. 5b, the locking pin 106 is

“bottomed out” with full travel of actuator 150. At this extreme position, tab portion 160 is preferably maintained a spaced distance from ear portion 56.

5 The drawings and the foregoing descriptions are not intended to represent the only forms of the invention in regard to the details of its construction and manner of operation. Changes in form and in the proportion of parts, as well as the substitution of equivalents, are contemplated as circumstances may suggest or render expedient; and although specific terms have been employed, they are intended in a generic and descriptive sense only and not for the purposes of limitation, the scope of the invention being delineated by the following claims.